## Space Weather Forecast

Issued on Tuesday, 23 May 2023 at 01:26 Local

**This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales**

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**Space Weather Forecast Headline: Further Minor/Moderate radio blackouts likely. G1 Minor/ G2 Moderate Geomagnetic Storms likely day 2 (23 May).**

**Analysis of Space Weather Activity over past 24 hours**

**Solar Activity:** Moderate with one Moderate flare from a small sunspot region in the southeast disc that has subsequently decayed further. The most complex region in the northeast quadrant, consists of a wide train of small spots, and remains a magnetically complex spot despite some stabilisation and gradual reduction in spot numbers. The large spot in the southeast, has seen some surrounding spots develop in the last 24 hours but remains stable. Despite this, activity has remained limited. The other regions are all smaller and simple to give at total of six sunspot regions on the disc. A weak CME (coronal mass ejection) was produced by the larger flare. This has been analysed as missing, but likely passing close to the Earth late on 26 May. No other Earth-directed CMEs have been observed.

**Solar Wind / Geomagnetic Activity:** Solar wind speeds have been elevated at 500-600 km/s, perhaps due to a connection to the fast wind of a coronal hole. The total magnetic field strength was Weak to Moderate. The north-south component was variable, but predominately negative (southward). Geomagnetic activity was mainly Unsettled to Active with one G1 Minor Storm interval 22/0000-0300 UTC.

**Energetic Particles / Solar Radiation:** The count rate of energetic particles (high energy protons) was at background with no solar radiation storms occurring.

**Four-Day Space Weather Forecast Summary**

**Solar Activity:** Solar activity is expected to be Low to Moderate. The main risk region is in the northeast quadrant, which has produced multiple Moderate flares in the last couple of days.

**Solar Wind / Geomagnetic Activity:** There are no Earth-directed CMEs, although a weak CME passing nearby may give a glancing influence late on day 4 (26 May). Current elevated solar winds are expected to continue through days much of the period, only gradually easing by later day 3 onward. Unsettled to Active geomagnetic activity expected with a chance of G1/Minor Storms, mainly day 1 (23 May) but perhaps day 2 (24 May). Activity easing to mainly Quiet with Unsettled intervals, and a chance of isolated Active spells by day 4 (26 May).

**Energetic Particles / Solar Radiation:** The count rate of energetic particles (high energy protons) is forecast to be at background with no solar radiation storms occurring. There is a slight chance of count rates increase towards the minor storm threshold however, if any large flares occur.

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# Met Office Space Weather Forecast

**Geomagnetic Storms:**

| Geo-Magnetic Storm Probability (Exceedance) | Level | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) (%) | Day 2 (00-24 UTC) (%) | Day 3 (00-24 UTC) (%) | Day 4 (00-24 UTC) (%) |
|---|---|---|---|---|---|---|
| Minor or Moderate | G1 to G2 | Yes | 40 | 20 | 1 | 5 |
| Strong | G3 | No | 1 | 1 | 1 | 1 |
| Severe | G4 | No | 1 | 1 | 1 | 1 |
| Extreme | G5 | No | 1 | 1 | 1 | 1 |

**Radio Blackouts - X Ray Flares:**

| X Ray Flares Probability | Level | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) (%) | Day 2 (00-24 UTC) (%) | Day 3 (00-24 UTC) (%) | Day 4 (00-24 UTC) (%) |
|---|---|---|---|---|---|---|
| Active | R1-R2 M Class | Yes | 55 | 55 | 55 | 55 |
| Very Active | R3 to R5 X | No | 5 | 5 | 5 | 5 |

**Solar Radiation Storms - (High Energy Protons):**

| Radiation Storms Probability (Exceedance) | Level ($cm^{-2}$ $sr^{-1}$ $s^{-1}$) | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) (%) | Day 2 (00-24 UTC) (%) | Day 3 (00-24 UTC) (%) | Day 4 (00-24 UTC) (%) |
|---|---|---|---|---|---|---|
| Active | ≥ S1 | No | 5 | 5 | 5 | 5 |
| Very Active | ≥ S3 * | No | 1 | 1 | 1 | 1 |

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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